

WHAT IS CLAIMED IS:

1 1. A method comprising:
2 identifying a plurality of secondary nodes to which an update to data is sent, wherein
3 at least one secondary node of the plurality of secondary nodes inserts the update in a
4 respective log of updates to a respective copy of the data; and
5 sending a notification to each of the plurality of secondary nodes when all of the plurality of
6 secondary nodes have acknowledged the update.

1 2. The method of claim 1 wherein
2 each secondary node of the at least one secondary node clears the update from the respective
3 log of updates in response to receiving the notification.

1 3. The method of claim 2 wherein
2 clearing the update from the respective log comprises updating a start-of-log pointer in the
3 respective log.

1 4. The method of claim 2 wherein
2 the clearing the update from the respective log comprises updating a pointer to a location in
3 the respective log, wherein
4 the pointer points to the location if the location contains a next update to clear.

1 5. The method of claim 1 further comprising:
2 determining that a location of a next update in a first respective log of updates to a first
3 respective copy of the data at a first secondary node of the secondary nodes differs
4 from a corresponding location of the next update in a second respective log of updates
5 to a second respective copy of the data at a second secondary node of the secondary
6 nodes; and
7 identifying a set of updates in the first respective log, wherein
8 each update of the set of updates is not in the second respective log; and
9 synchronizing the first respective copy and the second respective copy by applying the set of
10 updates to the second respective copy.

1 6. The method of claim 1 wherein
2 the determining occurs when a primary node maintaining the data fails.

1 7. The method of claim 1 further comprising:
2 setting a sent indicator for the update for one of the plurality of secondary nodes when the
3 update is sent to the one secondary node.

1 8. The method of claim 7 further comprising:
2 setting a received indicator for the update for the one secondary node when an
3 acknowledgement of the update is received from the one secondary node.

1 9. The method of claim 8 wherein
2 the sending the notification to each of the plurality of secondary nodes comprises determining
3 that a respective sent indicator and a respective received indicator for the update are
4 set for each of the plurality of secondary nodes.

1 10. A system comprising:
2 identifying means for identifying a plurality of secondary nodes to which an update to data is
3 sent, wherein
4 at least one secondary node of the plurality of secondary nodes inserts the update in a
5 respective log of updates to a respective copy of the data; and
6 sending means for sending a notification to each of the plurality of secondary nodes when all
7 of the plurality of secondary nodes have acknowledged the update.

1 11. The system of claim 10 further comprising:
2 clearing means for clearing the update from the respective log of updates in response to
3 receiving the notification.

1 12. The system of claim 10 further comprising:
2 determining means for determining that a location of a next update in a first respective log of
3 updates to a first respective copy of the data at a first secondary node of the secondary
4 nodes differs from a corresponding location of the next update in a second respective
5 log of updates to a second respective copy of the data at a second secondary node of
6 the secondary nodes; and
7 second identifying means for identifying a set of updates in the first respective log, wherein
8 each update of the set of updates is not in the second respective log; and
9 synchronizing means for synchronizing the first respective copy and the second respective
10 copy by applying the set of updates to the second respective copy.

1 13. A system comprising:
 2 an identifying module to identify a plurality of secondary nodes to which an update to data is
 3 sent, wherein
 4 at least one secondary node of the plurality of secondary nodes inserts the update in a
 5 respective log of updates to a respective copy of the data; and
 6 a sending module to send a notification to each of the plurality of secondary nodes when all
 7 of the plurality of secondary nodes have acknowledged the update.

1 14. The system of claim 13 further comprising:
 2 a clearing module to clear the update from the respective log of updates in response to
 3 receiving the notification.

1 15. The system of claim 14 wherein
 2 the clearing module further comprises
 3 an updating module to update a start-of-log pointer in the respective log.

1 16. The system of claim 14 wherein
 2 the clearing module further comprises
 3 an updating module to update a pointer to a location in the respective log, wherein
 4 the pointer points to the location if the location contains a next update to clear.

1 17. The system of claim 13 further comprising:
 2 a determining module to determine that a location of a next update in a first respective log of
 3 updates to a first respective copy of the data at a first secondary node of the secondary
 4 nodes differs from a corresponding location of the next update in a second respective
 5 log of updates to a second respective copy of the data at a second secondary node of
 6 the secondary nodes; and
 7 a second identifying module to identify a set of updates in the first respective log, wherein
 8 each update of the set of updates is not in the second respective log; and
 9 a synchronizing module to synchronize the first respective copy and the second respective
 10 copy by applying the set of updates to the second respective copy.

1 18. A computer-readable medium comprising:
 2 identifying instructions to identify a plurality of secondary nodes to which an update to data
 3 is sent, wherein

at least one secondary node of the plurality of secondary nodes inserts the update in a respective log of updates to a respective copy of the data; and sending instructions to send a notification to each of the plurality of secondary nodes when all of the plurality of secondary nodes have acknowledged the update.

19. The computer-readable medium of claim 18 further comprising: clearing instructions to clear the update from the respective log of updates in response to receiving the notification.

20. The computer-readable medium of claim 19 wherein the clearing instructions further comprise updating instructions to update a start-of-log pointer in the respective log.

21. The computer-readable medium of claim 19 wherein the clearing instructions further comprise updating instructions to update a pointer to a location in the respective log, wherein the pointer points to the location if the location contains a next update to clear.

22. The computer-readable medium of claim 18 further comprising: determining instructions to determine that a location of a next update in a first respective log of updates to a first respective copy of the data at a first secondary node of the secondary nodes differs from a corresponding location of the next update in a second respective log of updates to a second respective copy of the data at a second secondary node of the secondary nodes; and second identifying instructions to identify a set of updates in the first respective log, wherein each update of the set of updates is not in the second respective log; and synchronizing instructions to synchronize the first respective copy and the second respective copy by applying the set of updates to the second respective copy.

23. A computer system comprising: a processor for executing instructions, and a memory to store the instructions, wherein the instructions comprise identifying instructions to identify a plurality of secondary nodes to which an update to data is sent, wherein

6 at least one secondary node of the plurality of secondary nodes inserts the
7 update in a respective log of updates to a respective copy of the data;
8 and
9 sending instructions to send a notification to each of the plurality of secondary nodes
10 when all of the plurality of secondary nodes have acknowledged the update.

1 24. The computer system of claim 23 wherein
2 the instructions further comprise:
3 clearing instructions to clear the update from the respective log of updates in response
4 to receiving the notification.

1 25. The computer system of claim 23 wherein
2 the instructions further comprise
3 determining instructions to determine that a location of a next update in a first
4 respective log of updates to a first respective copy of the data at a first
5 secondary node of the secondary nodes differs from a corresponding location
6 of the next update in a second respective log of updates to a second respective
7 copy of the data at a second secondary node of the secondary nodes; and
8 second identifying instructions to identify a set of updates in the first respective log,
9 wherein
10 each update of the set of updates is not in the second respective log; and
11 synchronizing instructions to synchronize the first respective copy and the second
12 respective copy by applying the set of updates to the second respective copy.